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Infectious disease progression modeling

Models which can predict disease progression are useful for aiding clinicians in prescribing the correct treatment at the optimal time to produce the best outcome for the patient. Positive correlations between changes in a patient's infection state with respect to other factors of the patient's pro le such as age, gender and treatment. We utilize arti cial neural networks and phase type survival trees with di ering combinations of input covariates to nd which ones provide the best predictor of the future state. To demonstrate the model, we used a dataset of 1,838 patients infected with the human immunode ciency virus (HIV) which were enrolled in the Italian public structures between January 1996 and January 2008. e proposed disease progression models e ectively cluster, identify and quantify the e ects of these covariates and their interaction in the prediction of HIV disease progression. Our results show that antiretroviral treatment (ART) is the best prognosticator of a patient's future state followed by the CD4+ T-lymphocyte measurement. Other covariates such as gender and age have littl impact on the overall accuracy in prediction. Results improved dramatically when predicting if the patients' next state was AIDS (Acquired immunode ciency syndrome). ese results should aid in the management of HIV and its treatment while the methods developed through this research can also be useful for modeling disease progression in patients who have oth chronic conditions or diseases such as tuberculosis (TB), the severe acute respiratory syndrome (SARS), cardiovascular dise (CVD), cancer and diabetes.

Biography

/DOLW *DUJ KDV UHFHLYHG KLV 3K' GHJUHH IURP WKH 8QLYHUVLW\ RI 8OVWHU 8. LQ   +H KDV UHFH
IURP WKH %DUDWXOODK 8QLYHUVLW\ ,QGLD LQ   DQG 3RVWJUDGXDWH GHJUHH LQ ,QIRUPDWLRQ 7H
/HFWXUHU LQ &RPSXWHU ,QIRUPDWLRQ 6\VWHPV DW WKH 8QLYHUVLW\ RI 0DOWD 0DOWD +H ZDV D 5HV
8QLYHUVLW\ RI 8OVWHU 8. +LV UHVHDUFK LQWHUHVWV LQFOXGH PLVVLQJ GDWD KDQGOLQJ PDFKLQH
GRPDLQ +H KDV SXEOLVKHG PRUH WKDQ   WHFKQLFDO SDSHUV LQ UHIHUHHG MRXUQDOV DQG FRQIHUH

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J Infect Dis Ther 2016

ISSN: 2332-0877, JIDT an open access journal

Infectious Diseases 2016

August 24-26, 2016

Volume 4, Issue 4(Suppl)

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